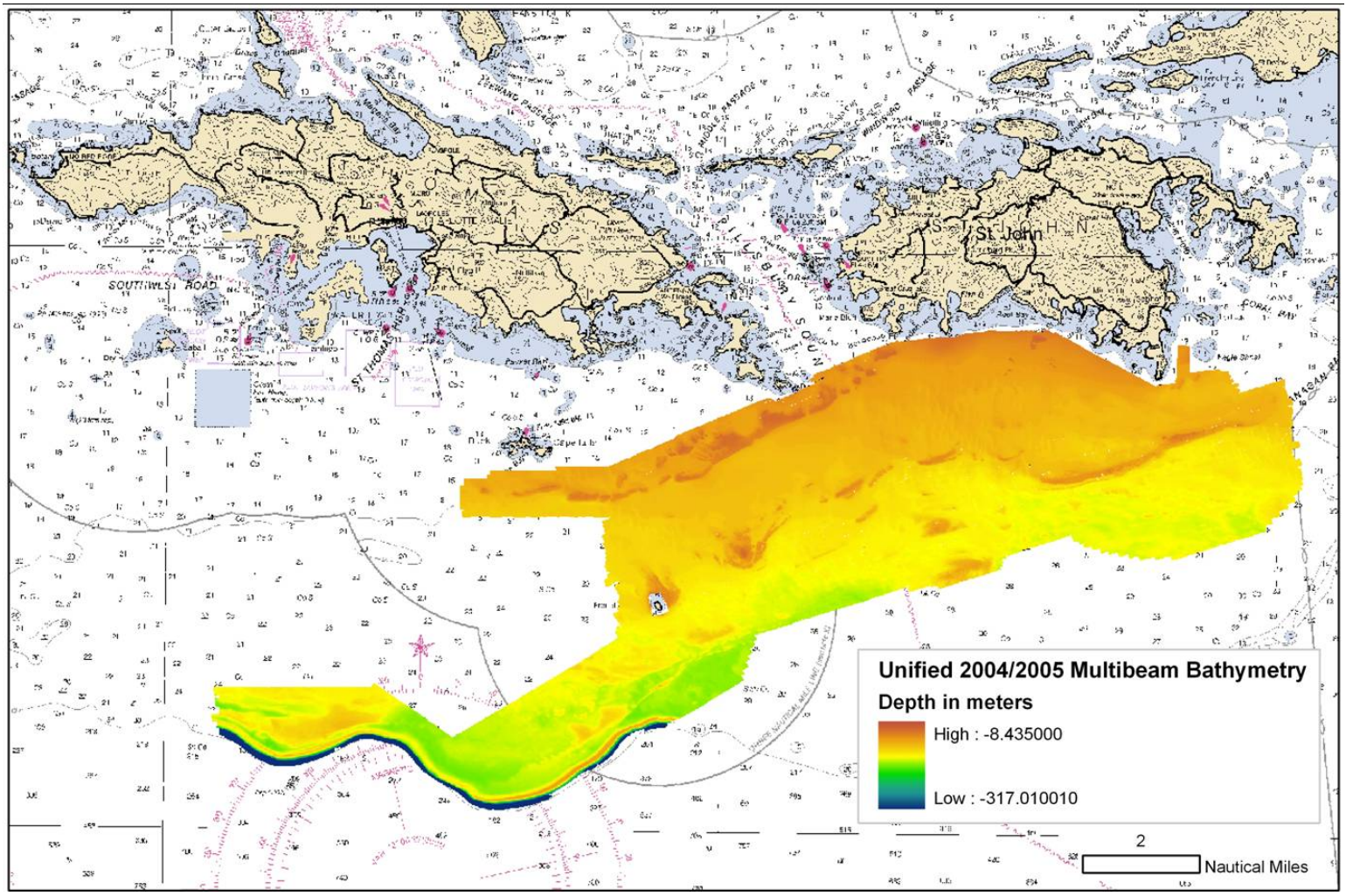
Seafloor Mapping Mission of U.S. Virgin Islands' Underwater Habitats

The scientists and crew aboard NOAA Ship NANCY FOSTER conduct sonar surveys of benthic habitats in the U.S. Virgin Islands, including an inshore survey area around the National Park Service's (NPS) USVI National Coral Reef Monument and Buck Island National Marine Reserve. The data gathered serves NOAA's National Ocean Service and the NPS in their objectives of characterizing the seafloor in the region by providing high-resolution bathymetry; habitat hardness, habitat roughness; and complementary video data that provides information about the associated biological communities. The data acquired also serves the Office of Coast Survey to update nautical charts for safe navigation. For more information, go to ***http://ccma.nos.noaa.gov/ecosystems/coralreef/usvi_nps.html***.

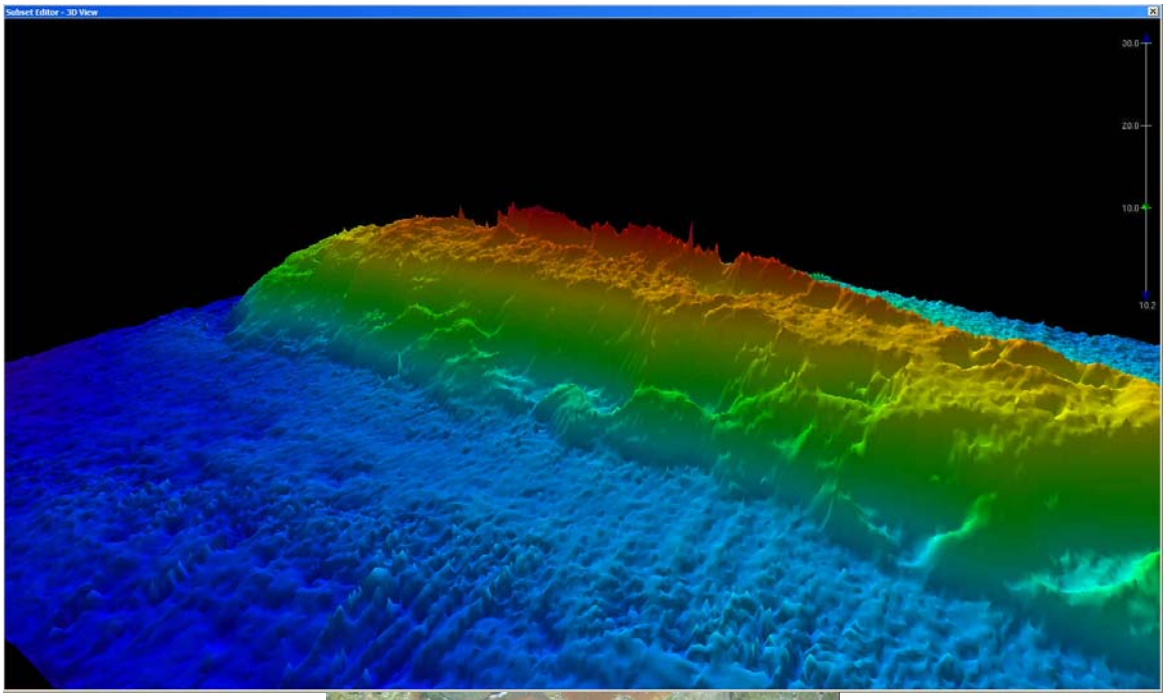


Survey areas in St. John and St. Thomas using multibeam sonar

Characterization of Navassa National Wildlife Refuge

NANCY FOSTER, along with the Center for Coastal Fisheries and Habitat Research (CCFHR), conducts projects to generate habitat maps for resource managers using sidescan, multibeam sonar, drop cameras, ROV, and diver surveys. Drop camera, diver surveys, and interviews with fishermen will determine the abundance of artisanal fishing gear, type of gear used, benthic habitats fished, catch landed, and impact to benthic resources.

Quantifying of the physical environment around Navassa by using Conductivity Temperature and Density casts, light profiles, installation of long-term temperature loggers, and Acoustic Doppler Current Profiler data will help to model benthic productivity and to determine potential susceptibility to coral bleaching. Scientists assess the population status of species (conch and turtles) newly targeted by artisanal fishers and the ship provides the Fish and Wildlife Service personnel access to Navassa Island for terrestrial sampling and scientific observations. For more information, go to ***www.ccfhr.noaa.gov***.



This image was generated by multibeam sonar Picture taken by ROV

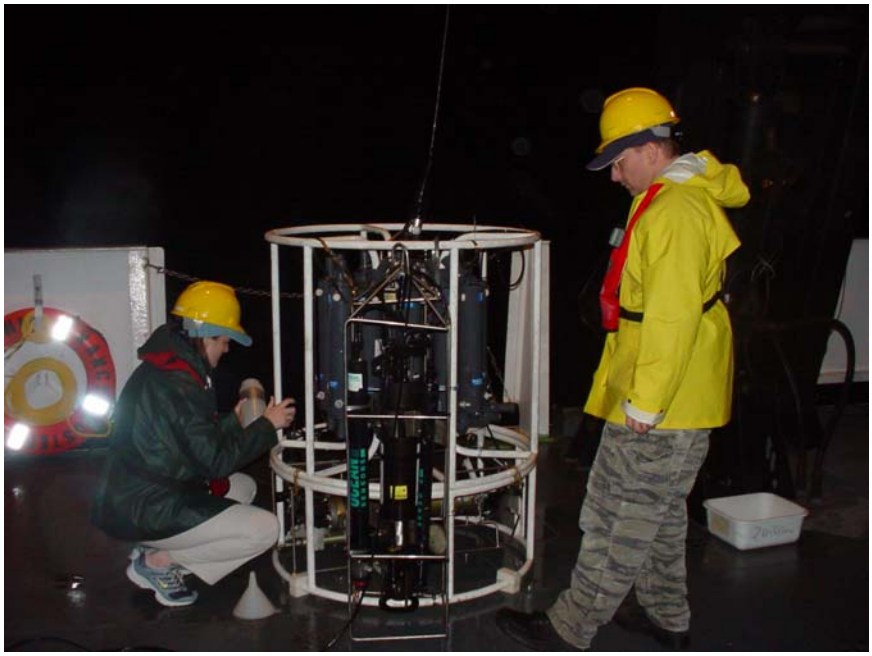
Habitat Recovery Rates of Injured Seagrass in Southeastern Caribbean

CCFHR and NANCY FOSTER sample seagrass in areas surrounding Puerto Rico and USVI to determine habitat recovery rates for calibration of a seagrass injury and disturbance recovery models. Fish communities associated with bank-shelf and mangrove habitats are quantitatively sampled to determine resource value as nursery and adult fishery habitats. Other projects include conducting benthic habitat surveys to confirm existing habitat maps, resource values and collect Ciguatoxic fishes, barracudas, for developing a toxin standard. For more information, go to ***http://ccfhr.noaa.gov/stressors/resources/puerto-rico-cruise-2006/mission***.

Sea Grant Cruise, Winyah Bay, South Carolina

NANCY FOSTER partners with South Carolina Sea Grant to provide graduate students with an educational opportunity to conduct field work in environmental science. Students conduct experiments to study sediment transport in the Winyah Bay National Estuarine Research Reserve. The research objective is to determine the rate at which the channel fills with sediment and directly supports State and Federal efforts concerning safe maritime commerce and navigation. During this project, tide and current data are acquired with an *Advanced Design Current Profiler* (ADCP) towed from the ship. As of the 2006 Field Season, NMAO has installed a hull

mounted ADCP transducer on NANCY FOSTER which will collect real time data during all missions and be available to a diverse scientific audience.

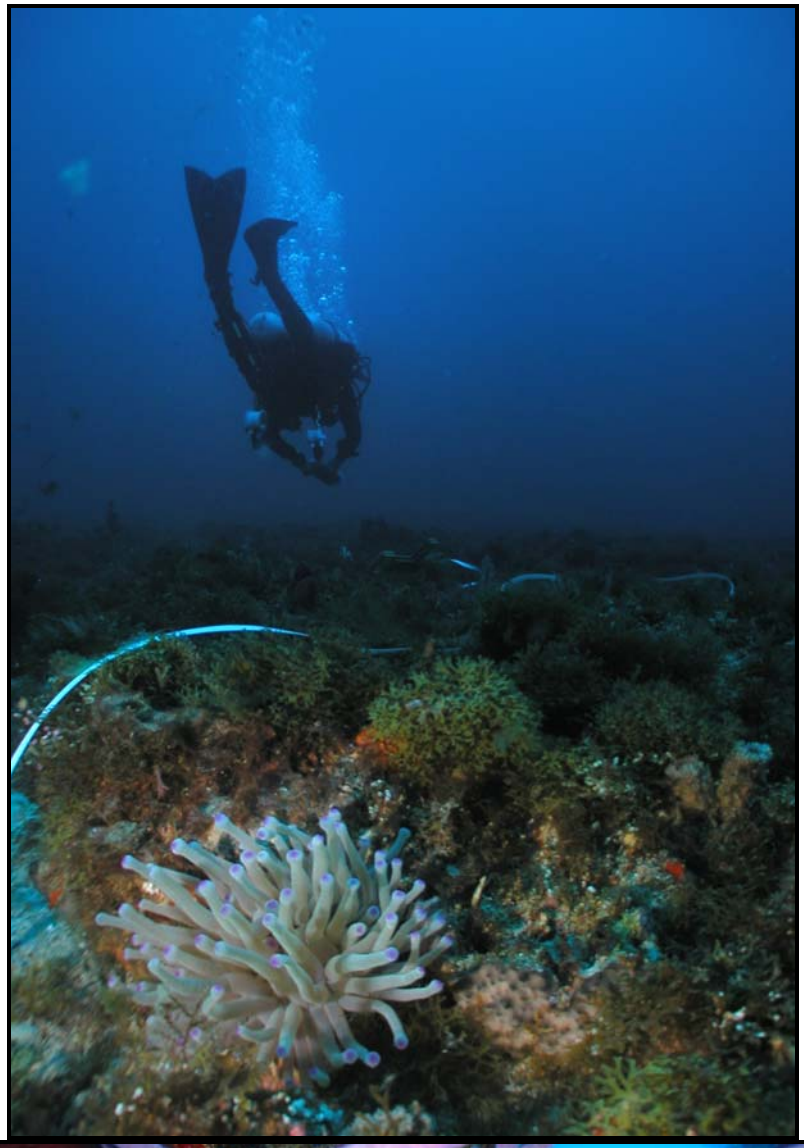


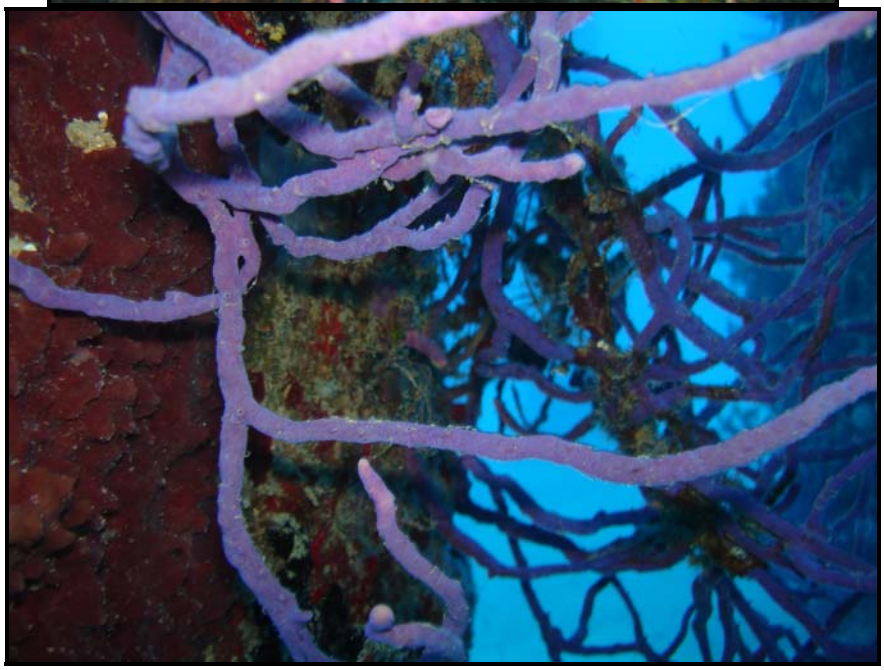
Coastal Erosion Studies Along the South Carolina Shoreline

NANCY FOSTER works with Coastal Carolina University to identify, through mapping and sub-bottom analysis, areas of the seafloor that can be efficiently mined for sand. It is a little known fact that quality beach sand is a limited resource along our coasts. Once harvested, the sand is used to re-nourish Myrtle Beach, Folly Beach, and other areas which are subject to substantial beach erosion from long shore currents, hurricanes, and strong winter storms known as "Nor'easters". These mapping efforts pay dividends when the State and Federal governments plan beach renourishment efforts as they are able to pinpoint where available sand is in advance of the project. The ship also conducts core samples off the South Carolina Coast to determine the types of minerals and sediment which can be mined to supplement the Myrtle Beach and Folly Beach re-nourishment projects. This same project collects data that describes the geological history of South Carolina's Coast. For more information on this project, go to ***www.ccu.edu***.

Atlantic Coral Reef Abundance and Distribution Assessment – Ocean Exploration

In order to determine the distribution of species composition of coral communities, NANCY FOSTER partners with Duke University Marine Laboratory and National Undersea Research Center - University of North Carolina at Wilmington. The research encompasses how these species have changed over the past 20 years due to temperature increase. The surveys conduct habitat mapping in the areas of interest using multibeam; visual surveys of benthic communities using drift camera surveys, photo-documentation and collection of tropical coral species by scuba divers.





Gray's Reef Nation Marine Sanctuary Fishery Assessment Methodology Comparison and Regional Development Cruise

Within the Gray's Reef National Marine Sanctuary (GRNMS), NANCY FOSTER provides surface and diving support to aid regional academic scientists and educators the opportunity to see the sanctuary first-hand so that they may develop hypotheses to address science-driven management questions. Sampling activities include deploying acoustic equipment for the assessment of fisheries biomass; deploying fish traps to examine catch and avoidance rates of target species; and conducting dive operations for specimen collections, direct visual censuses of fish species across habitat types, and collecting specific data to provide fine scale habitat characterizations within the GRNMS. For more info, go to ***www.grnms.noaa.gov***.

Biological and Cultural Resources of the Stellwagen Bank National Marine Sanctuary

NANCY FOSTER supports a diverse array of research objectives for NOAA's Stellwagen Bank National Marine Sanctuary (SBNMS) off the coast of Massachusetts during the months of June and July. SBNMS partners with the best and brightest to achieve their research objectives. Cruise participants include personnel

from the University of Connecticut, SBNMS Maritime Heritage division, Cornell University, Duke University Marine Laboratory, Hawaii Institute of Marine Biology, NOAA's National Marine Fisheries Service, Center for Coastal Studies, University of New Hampshire, Woods Hole Oceanographic Institute, and the Whale Center of New England. Scientists look at geological, biological, and anthropogenic processes that affect benthic habitats and utilize side scan sonar imagery and magnetic data from discrete areas to locate maritime heritage resource sites. Behavior patterns of whales and how they are affected by vessel traffic and underwater sounds are also studied. For more information, go to ***www.sbnms.noaa.gov***.

Status and Assessment of Invasive Indo-Pacific Lionfish in North Carolina Hard Bottom Communities

In April of 2005 NANCY FOSTER began supporting the NOAA National Ocean Service (NOS) Beaufort Laboratory to assess the status of the Indo-Pacific Lionfish which is one of the most invasive exotic species along the eastern United States. A highly trained team of technical divers made up of personnel from NOS, the Duke University Marine Lab, the National Underwater Research Center at University of NC-Wilmington, and the Tampa Aquarium accomplish sampling of this species at random locations off the coast of North Carolina. Decompression dives at depths ranging from 100–170 feet are carried out to conduct visual surveys, capture

live specimens, recover and deploy long term temperature data loggers, and obtain photo and video documentation. Numerous lionfish are caught for dissection, kept alive for later research, or for show in aquarium exhibits. For more information on this project please visit ***www.nos.noaa.gov***.

Comparative Analysis of the Function of the Disturbed and Undisturbed Coral Reef and Non-Coral Ecosystems in the Dry Tortugas

NANCY FOSTER works with Duke University Marine Laboratory concerning the Dry Tortugas National Park (DTNP) and surrounding ecological reserves. Dive operations are performed comparing the coral population in the DTNP, a protected area to unprotected areas, to determine if there are any major differences in the health of coral reefs. Ground truthing is conducted through the use of drift cameras. Beam trawling is used to check for the presence of gear or other hazards on the bottom in the area north of the DTNP, a prime fishing and shrimping ground.

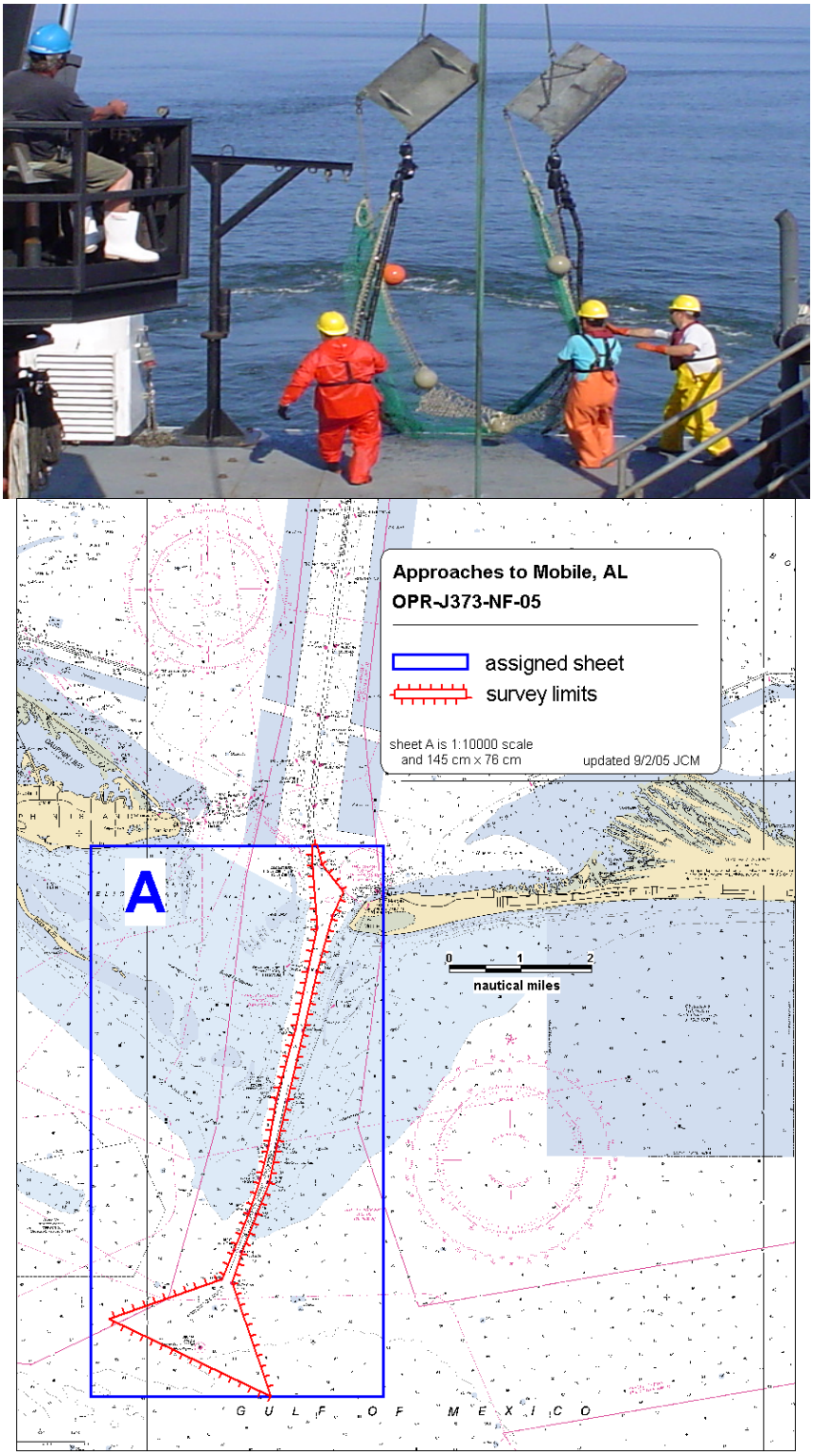
Florida Keys Coral Disease and Condition Survey

NANCY FOSTER operates with a joint crew from the Florida Keys National Marine Sanctuary, and the Environmental Protection Agency (EPA), to conduct dive operations to assess the conditions of the coral reef. Sites range from Alligator Reef to the Dry Tortugas. Surveys conduct water quality samples using the Conductivity, Temperature and Density Sensor (CTD), as well as ultraviolet profile. Test results demonstrate where more surveys or protection may be needed for future reef preservation. For more information, go to ***www.fknms.noaa.gov***.

Special Note:

NANCY FOSTER partners with state and federal agencies in response to hurricane disasters. A full range of resources are used aboard the ship to conduct these vital missions. At the request of Office of Coast Survey, under the National Ocean Service, hydrographic surveys are conducted to promote safe navigation by ensuring deep draft channels are clear of obstructions.

The National Marine Fisheries Service and EPA sail aboard to sample for fish and analyzing water quality for toxins.



NANCY FOSTER also works with National Buoy Data Center recovering buoys in need of repair to acquire important seas state and meteorological data for the maritime community, the National Weather Service, and National Hurricane Center. The ship has the capability to deploy and recover tsunami (DART) and other smaller weather buoys.